

# HEALTH IMPACTS OF THE BUILT ENVIRONMENT: PHYSICAL INACTIVITY, EXPOSURE TO AIR POLLUTION, AND ISCHEMIC HEART DISEASE

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**Background:** Physical inactivity and exposure to air pollution are important risks globally. Urban planning and the built environment may influence exposures to these risk factors in different ways and thus differentially impact the health of urban populations.

**Aims:** To investigate the built environment's influence on air pollution exposure and physical inactivity and subsequent health impacts.

**Methods:** We use a regional travel survey to estimate within-urban variability in physical inactivity and air pollution exposure ( $PM_{2.5}$ ,  $NO_x$ ,  $O_3$ ) for ~30,000 individuals in Los Angeles. We then estimate the resulting risk for ischemic heart disease (IHD) using literature-derived dose-response values for the general public and for a sensitive subpopulation. We compare estimated IHD mortality risks between neighborhoods based on "walkability" scores, and conduct sensitivity analyses to explore robustness of our results.

**Results:** The proportion of non-sedentary individuals is ~2× larger in high- vs. low-walkability neighborhoods (24.9% vs. 12.5%); however, since a small share of the total population is physically active, between-neighborhood variability in estimated IHD mortality attributable to physical inactivity is modest (7 fewer IHD deaths per 100,000 in low- vs. high-walkability neighborhoods). Since spatial patterns differ for air pollutants, risks from air pollution exposure are similar between neighborhoods (9 fewer [13 more] IHD deaths per 100,000 for  $PM_{2.5}$  [ $O_3$ ] in low- vs. high-walkability neighborhoods). This suggests health benefits from increased physical activity may be realized in high-walkability neighborhoods only because of tradeoffs in air pollution exposure. Comparisons to data from other cities suggest our core conclusions are not unique to Los Angeles.

**Conclusions:** Accounting for exposure to air pollution is a critical aspect of planning for more clean and health-promoting cities.